QUALITY ASSURANCE PROJECT PLAN

AMENDMENT

CLAM TISSUE SAMPLING

WYCKOFF/EAGLE HARBOR SUPERFUND SITE
Bainbridge Island, WASHINGTON

EPA CERCLIS SITE ID# WA009248295

Prepared for:

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TITLE AND APPROVAL SHEET
2014 CLAM TISSUE SAMPLING
QUALITY ASSURANCE PROJECT PLAN (QAPP) AMENDMENT
WYCKOFF/EAGLE HARBOR SITE, BAINBRIDGE ISLAND, WASHINGTON

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QUALITY ASSURANCE PROJECT PLAN AMENDMENT

This Quality Assurance Project Plan (QAPP) amendment describes the second clam tissue sampling activities which are a part of the existing monitoring for the Wyckoff/Eagle Harbor Superfund Site remedy and additional sample locations have been added to the May 2011 QAPP. The Wyckoff/Eagle Harbor Superfund site is located on the southern shoreline near the entrance to Eagle Harbor and has four operable units (OUs). This QAPP is concerned with the East Harbor OU that includes intertidal and subtidal sediments of the site. The remedy for the Wyckoff/Eagle Harbor Superfund Site included: placement of a clean sediment cap over approximately 50 acres of contaminated subtidal and intertidal sediments in the East Harbor. The QAPP amendment is based on the *Intergovernmental Data Quality Task Force Uniform Federal Policy for Quality Assurance Project Plans Guidance (EPA 2009)*. Data from the additional clam tissue sampling activities will be included in the next Five Year Review.

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ATTACHMENTS **(refer to QAPP August 2013)**

LIST OF ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DoD	Department of Defense
DOH	Washington State Department of Health
EIM	Environmental Information Management
EPA	United States Environmental Protection Agency
g	grams
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Site Operations Training
HPAH	High-molecular weight PAHs
MEL	EPA Region 10 Manchester Environmental Lab
MRL	Method Reporting Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
PQOs	Project Quality Objectives
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QSM	Quality Systems Manual for Environmental Laboratories
RI/FS	Remedial Investigation / Feasibility Study
ROD	Record of Decision
RPM	US Environmental Protection Agency Remedial Project Manager
RSCC	Regional Sample Control Coordinator
SOP	Standard Operating Procedure
SSHP	Site Safety & Health Plan
TOC	Total Organic Carbon
µg/kg	Microgram per kilogram
USACE	United States Army Corps of Engineers
USACE PM	USACE Project Manager

1. PROJECT MANAGEMENT AND OBJECTIVES

1.1. Project Organization, Responsibilities and Authority

This amendment describes changes to a Quality Assurance Project Plan (QAPP) for clam tissue sampling that was approved and implemented in May 2011. The sampling will be repeated in 2014. The only significant change to the May 2011 QAPP is the addition of one beach –West Beach – to the sampling plan. Sample handling and analytical procedures remain largely the same and the reader should review the May 2011 QAPP along with this Amendment. The Project Delivery Team (PDT) for this QAPP Amendment includes members from United States Environmental Protection Agency Region 10 (EPA) and the United States Army Corps of Engineers (USACE), and the Suquamish Tribe. Funds for this project have been secured through the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) cleanup program.

The project team provides the overall framework for the data collection approach by defining project objectives and data quality requirements, and ensuring that they are met during the execution of the project. The project team will keep the EPA Remedial Project Manager (RPM) informed of how the project is proceeding. Project updates will be given to the EPA RPM by the USACE Project Manager (USACE PM) during regularly scheduled meetings, phone calls, and emails or faxes as appropriate. The roles of the project team members are the same as the previous QAPP with the change of the EPA Remedial Project Manager from Howard Orlean to Helen Botcher.

1.1.1. EPA Region 10 Personnel Responsibilities and Qualifications (refer to QAPP May 2011)

1.1.2. USACE Personnel Responsibilities and Qualifications (refer to QAPP May 2011)

1.1.3. Special Training Requirements and Certifications(refer to QAPP May 2011)

1.2. Project Planning

1.2.1. Project Planning (Scoping)

Several meetings have been held with EPA, the Suquamish Tribe and USACE PDT members. Topics discussed included:

- Project Schedule
- Data Collection for the Next Five Year Review
- Inclusion of Sampling at West Beach

The outcomes of the meetings are documented by incorporation into this amended QAPP. Additional meetings will be held as needed to incorporate lessons learned, changes in scope, and to support continuous improvement.

1.2.2. Problem Definition, Site History, and Background

The Wyckoff/Eagle Harbor Superfund site is located on the east side of Bainbridge Island, in Central Puget Sound, Washington. The East Harbor Operable Unit (OU 01) consists of more than 70 acres of

intertidal and subtidal habitats that were contaminated by releases of creosote and other wood-treating chemicals from a now defunct wood treating plant. The releases contaminated the bottom sediments of Eagle Harbor, primarily with polycyclic aromatic hydrocarbons (PAHs). In 1994-95, the EPA capped more than 50 acres of the harbor by placing a three foot thick layer of clean dredged sand on top of the contaminated sediments. Additional subtidal and intertidal capping took place in 2000 and 2001. In 2008, intertidal capping was extended along the beach west of the former processing area. Although most of the contaminated portions of the harbor and intertidal areas have now been capped, two areas – the east beach and the north shoal -- have not been capped or otherwise remediated. Creosote seeps still occur on these beaches. The EPA is currently evaluating options to clean up the two remaining beaches.

To ensure that the capped areas of the site remain protective of human health and the environment, the EPA monitors contaminant concentrations in sediments, porewater, and in the tissues of clams collected from the beaches. Specific long-term monitoring objectives for Eagle Harbor are grouped into two major areas: 1) monitor conditions on the completed subtidal sediment cap for effectiveness and potential for recontamination, and 2) monitor intertidal areas for contaminant containment, natural recovery, stability, and habitat use. Monitoring of intertidal sediment indicates that while some sediment remains contaminated above state criteria, eelgrass is abundant in the east beach and north shoal areas except in and immediately adjacent to seeps.

Eagle Harbor is within the usual and accustomed fishing area of the Suquamish Tribe, whose reservation is located on the Kitsap Peninsula north of Bainbridge Island. The Suquamish Tribe retains the right to harvest fish and marine invertebrates and to have fishery resource habitat areas protected within the Tribe's usual and accustomed fishing areas.

The work described in this amended QAPP is as follows:

1. Determine if clam tissue contamination levels have changed.

2. Obtain clam tissue sampling data for contaminants of concern described in the ROD.

3. Compare clam tissue PAH levels and lipids to those from the 2011 sampling event.

Clam tissue PAH concentrations will be used in the next Five-Year Review and to update sampling locations and procedures as appropriate. Sampling will be expanded from the previous locations to include West Beach. This determination was made after a site visit in January 2014 with the Suquamish Tribe that determined sufficient horse clams were present for harvest. The work is expected to be completed during the low tides in May 2014. Collection and analysis will assist EPA to assess the natural recovery process. The ROD states that monitoring is necessary to document natural recovery.

Clam tissue analytical results will provide current tissue concentrations which will be compared to previous monitoring results to determine if concentration trends exist. These results may be used to determine if collected clams have been impacted by contaminants associated with the Wyckoff/Eagle Harbor site, and whether or not they are suitable for human consumption based on health protective values to be derived.

There are no established tissue-based PAH protectiveness goals in the ROD. The ROD states a sediment-based human health objective of 1,200 ug/kg dry wt high-molecular weight polycyclic aromatic hydrocarbons (HPAH), based on the 90th percentile of background Puget Sound subtidal sediments.

HPAHs were considered to have approximated the carcinogenic PAHs evaluated during the ROD risk assessment.

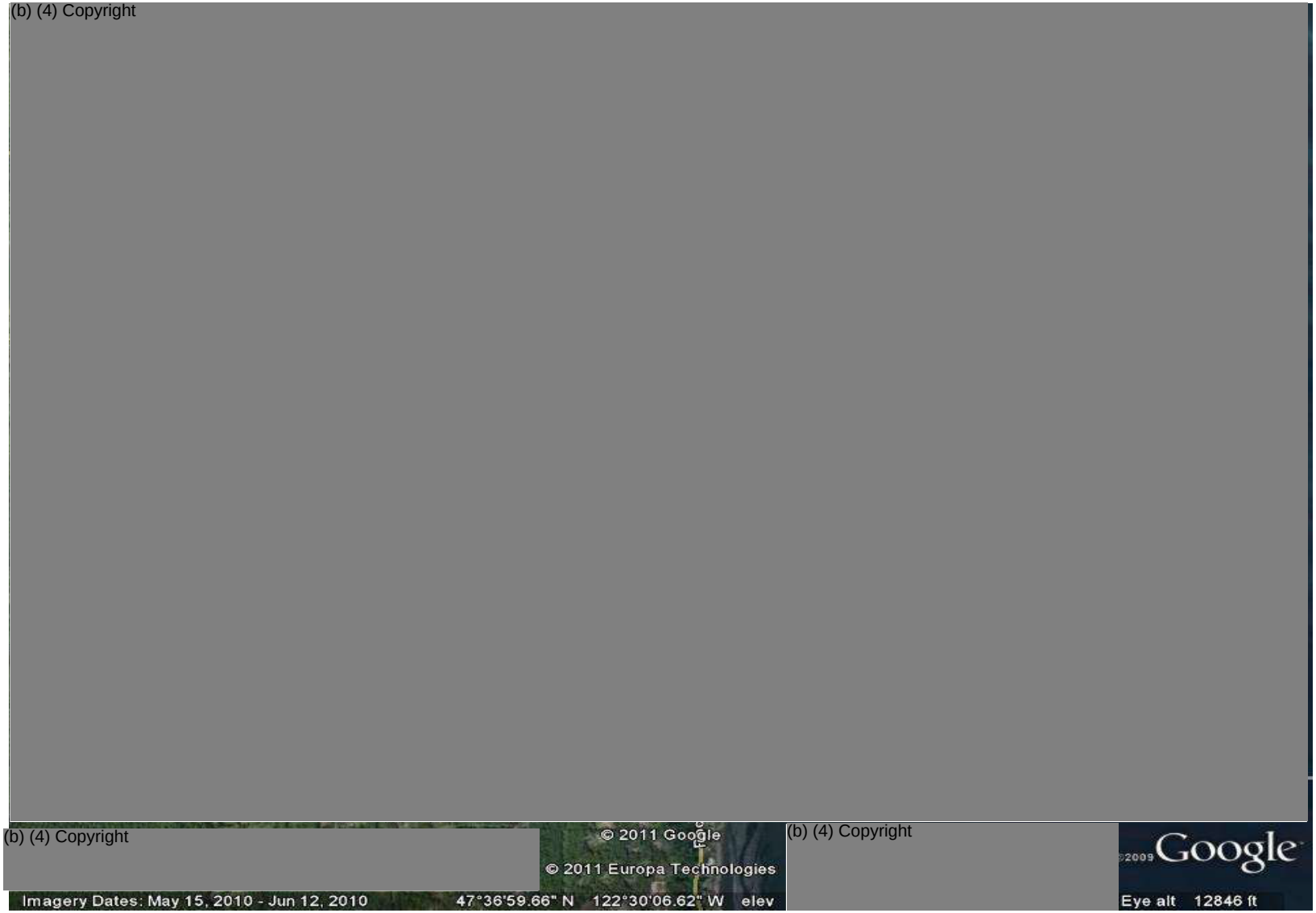

Figure 1. **Wyckoff/Eagle Harbor Vicinity Map**

Figure 2. Wyckoff Sampling Locations

1.2.2.1 Remedy and Status (refer to QAPP May 2011)

The ROD states a sediment-based human health objective of 1,200 ug/kg dry wt high-molecular weight polycyclic aromatic hydrocarbons (HPAH), based on the 90th percentile of background Puget Sound subtidal sediments. This monitoring event is designed to provide additional data on clam tissue PAH concentrations over time and include the addition of samples from West Beach (considered a clean beach). Clams will be collected from all beach locations and analyzed for PAH concentrations and lipid content. The data may be of sufficient quality to determine if concentrations have changed between the 2014 and 2011 clam tissue data and provide data sufficient to support future human health risk assessment (HHRA).

Native horse clams will be collected from approximately the same locations as during the May 2011 monitoring event in Eagle Harbor. Clams will be collected and analyzed for PAH tissue concentrations and percent lipid content. A minimum of 100 g of clam tissue (whole body without shell) is required for each composite for analysis of PAH and lipids. Based on the clam weights from the 2011 monitoring event in Eagle Harbor it is approximated that two clams of legal size (5 inches and having 78 grams of shucked tissue each) will provide the 20 grams of tissue needed for the PAH analysis (10 g) and lipid determination (10 g) from each sample location. The individual clams from the 2011 event with shell weighed from 260 g to almost 1 kg with the shucked meat weighing about 30 percent of the whole clam. Samples designated for duplicates, matrix spike and matrix spike duplicates will need at least 40g of homogenized material.

1.3. Project Quality Objectives and Measurement Performance Criteria

1.3.1. Development of Project Quality Objectives Using the Systematic Planning Process

Project Quality Objectives (PQOs) are developed through the systematic planning process as described in the UFP-QAPP Guidance. They are used for determining the type, quantity, and quality of data as described in Table 1 .

Table 1. Project Quality Objectives

Data Quality Objectives - Wyckoff /Eagle Harbor Clam Tissue Sampling			
Problem Statement	Investigation Method	Performance Criteria	Data Use
1. How is the Natural Recovery remedy affecting PAH tissue concentrations in horse clams?	Collect horse clams from the 4 beach segments in May 2014: West Beach, Intertidal Cap, North Shoal, East Beach. Those sample concentrations will be compared to the tissue concentrations from the 2011 sampling event.	Analyze harvestable size horse clam tissue for PAHs and lipid content. PAH laboratory detection limits will be at the 1 µg/kg MRL or better.	Are tissue concentrations declining over time? If yes, this will indicate that monitored natural recovery is still occurring. 2014 sampling results will provide current data

			against which post-remediation data can be compared.
2. Are the tissue PAH concentrations at West Beach (clams approximately 3 years old) different from concentrations at the other 3 segments?	Compare tissue PAH concentration from West Beach clams to each of the other segments PAH tissue concentrations.	Analyze edible horse clam tissue for PAHs and lipid content. PAH laboratory detection limits will be at the 1 µg/kg limit or better.	Do clams that have recently settled at West Beach (a clean habitat) have PAH concentrations lower than clams from the other beaches? If yes, this will indicate that remediation to reduce the concentration of PAHs in sediments on East Beach and North Shoal will be effective in reducing PAHs in shellfish.
3. Is there sufficient data to calculate a HHRA for subsistence users eating horse clams?	Determine the appropriate parameters for use in a HHRA regarding consumption rates. Analyze horse clam tissue for HPAHs and lipids.	Detection limits are sufficiently sensitive to calculate TEQs.	Calculate PAH concentrations in shellfish tissues and use the results to calculate the risk of shellfish consumption at recreational and subsistence consumption levels.

Table 2. Project Data Needs (Remedy Perspective)

Data Need		Data Use		Number or Frequency of Primary Samples	Concentration of Interest; Sensitivity of Measurement	Remediation Area(s)/Sample Location(s)
Target Analyte or Characteristic of Interest	Matrix	Remedy Method(s) of Interest	Criteria to be Considered			
Remedy Perspective						
PAHs	Tissue	Sediment Cover	Conceptual Site Model	12	1 µg/kg (wet weight)	Wyckoff/Eagle Harbor Intertidal Area
Lipid	Tissue			12	Top-loading balance: ±2% or ±0.02g, whichever is greater	

1.3.2. Measurement Performance Criteria (refer to QAPP May 2011)

1.4. Secondary Data Evaluation (refer to QAPP May 2011)

1.5. Project Overview and Schedule

Through project planning, the project team has agreed on the purpose of the project, the environmental questions that are being asked, and the environmental decisions that must be made. PQOs have been developed specifying the type, quantity, and quality of data needed to ensure that project data can be used for the intended purpose to answer specific environmental questions, support environmental decisions, and determine technical activities that will be conducted. Table 3 provides a summary of the project tasks to be completed and Table 4 describes the project schedule.

Table 3. Project Tasks

Plan, Prepare QAPP
• Prepare an amended QAPP and a site-specific Site Safety Health Plan to govern the amended sampling • Prepare, finalize, and approve amended QAPP
Sampling Tasks
• Sample clams at 12 intertidal sample locations (includes field duplicates)
Analytical Tasks
• Analyze all clam tissue PAH samples by EPA Method 8270D with GC-MS-MS • Analyze lipids gravimetrically by EPA Method 3541C ($MeCl_2$ extraction) per MEL SOP
Quality Control Tasks
• Tissue (PAH and lipids) samples will have 1 field duplicate for each beach location and one MS/MSD sample.

• Analytical methods QC will comply laboratory SOPs.
Secondary Data
• No secondary data will be collected.
Data Management Tasks
• EPA Scribe software will be used for data management as per R10 Data Management Plan (4/2014) • Validated/verified analytical data and sample coordinates will be placed in the EQuIS™ database. Data from the Scribe format will be used to provide input into the EIM database.
Documentation and Records
• Follow EPA R10 Data Management Plan for collection of field data including use of Scribe • All generalized sample locations will be recorded in field notebook. • Field notebook will contain the following: date and time of sample collection, weather conditions, sample identification number, type of sample, general location of sampling points (GPS), any procedural steps taken that deviate from those outlined in this amended QAPP. • Prepare a Final Monitoring Report that describes the field effort, sampling results and data quality, decisions made, and recommendations for future actions
Data Packages
• 100% of data packages will be validated through Stage 4 (S4VM) by EPA MEL. All data packages will be delivered to USACE and also maintained at MEL at the Stage 4 level.
Assessments and Audits
• Sampling SOPs have been reviewed. • Field sampling records will undergo review after the samples are collected. • Laboratory sample receipt reports will be reviewed after samples are received. • Scribe files and deliverables will be verified by the EPA RSCC and MEL upon receipt (R10 Data Management Plan 4/2014).
Data Review Tasks
• The laboratory performing analyses of samples will verify that all data are complete for samples received. • Data will be validated undergo a full data quality review in accordance with the EPA Manchester Laboratory review policies and standard operating procedures • Validated data will be reviewed by USACE . • Data usability will be assessed by USACE. • Measurement performance criteria set in QAPP checked by USACE. • Data limitations will be determined. Data compared to Project Objectives by USACE.

Table 4. Estimated Project Schedule

Task #:Description	Start	Finish
Task #1: Plan, Prepare QAPP		
Prepare amended QAPP and SSHP	3/21/2014	4/17/2014
Submit amended QAPP for comments and receive comments	4/20/2014	5/01/2014
Final amended QAPP approval	5/02/2014	5/04/2014
Task #2: Field Work (Plan, Collect Clams)		
Collect clams and submit to EPA Manchester lab	5/15/2014	5/16/2014

Task #:Description	Start	Finish
Task #3: Review Lab Data and Prepare Monitoring Work		
Analysis turnaround anticipated	5/19/2014	7/14/2014
Review lab data and prepare data quality reports	7/15/2014	8/1/2014
Prepare draft monitoring report	7/15/2014	8/15/2014
USACE internal review comments due	8/18/2014	8/22/2014
Prepare draft final monitoring report	8/25/2014	8/29/2014
EPA/Tribe review	9/2/2014	9/19/2014
Prepare Final Monitoring Report	9/22/2014	9/29/2014

2. MEASUREMENT AND DATA ACQUISITION

2.1. Sampling Tasks

2.1.1. Sampling Process Design and Rationale

Additional clam tissue samples will be collected from West Beach in additional to clams from the same locations as the May 2011 event. Clam tissue collection and analysis will focus on the horse clam (*Tresus capax*) of harvestable size.

2.1.2. Sampling Procedures and Requirements (refer to QAPP May 2011)

2.2 Analytical Tasks (refer to QAPP May 2011)

2.3 Sample Collection Documentation, Handling, Tracking and Custody Procedures (refer to QAPP May 2011)

2.4 Quality Control Samples (refer to QAPP May 2011)

Sufficient sample mass shall be collected to include the following QC samples. Sample duplicates and MS/MSDs are not required to be obtained from the sample horse clam.

QC Sample Requirements					
Analytical Parameter	**# Sample Duplicates (grams)**	**% Sample Duplicates (min. approx 10%)**	**MS/MSDs**	**%MS/MSD (min. 5%)**	**Laboratory Triplicate RSD (?)**
PAHs	1 (10g)	8.3%	1 (20g)	8.3%	NA
% Lipids	1 (10g)	8.3%	NA	8.3%	1 sample (30g)

2.5 Data Management Tasks (refer to QAPP May 2011)

All project documents and analytical data will be archived in accordance with The Army Records Information Management System (ARIMS) or AR 25-400-2. Information specific to each document is described below.

2.5.1 Project Documentation and Records (refer to QAPP May 2011)

2.5.1.1 Amended QAPP and Site Safety and Health Plan

Hardcopies of the amended QAPP and Site Safety and Health Plan will be stored in project files. Electronic copies will be stored on assigned network drives.

2.5.2 Data Package Deliverables (refer to QAPP May 2011)

2.5.3 Electronic Data Reporting Formats

COC forms will use Scribe format for hand delivery to Manchester Laboratory. The electronic COC will be submitted the next business day to the laboratory to include information hand entered on the hard copy COC that accompanies the field samples.

2.5.4 Data Handling and Management (refer to QAPP May 2011)

2.5.5 Data Tracking and Control (refer to QAPP May 2011)

3. ASSESSMENT AND OVERSIGHT (refer to QAPP May 2011)

4. OVERVIEW (refer to QAPP May 2011)

Data review is the process which data are examined and evaluated to varying levels of detail and specificity by a variety of personnel who have different responsibilities within the data management process. It includes verification, validation, and usability assessment. This process ensures the review activities produce scientifically sound data that are of known and documented quality and meet PQOs used in making environmental decisions.

5. REFERENCES

U.S. Enviornmental Protection Agency. 2014. *Data Management Plan for Environmental Monitoring and Associated Geospatial Data (Draft)*

U.S. Environmental Protection Agency. 2009. *Intergovernmental Data Quality Task Force Uniform Federal Policy for Quality Assurance Project Plans Guidance*

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